WHAT IS CLAIMED IS:

1. An optical communication apparatus for transmitting an intermittent optical signal from a transmitting side to a receiving side by using wavelength information of the optical signal as an address, the apparatus comprising:

m (m is a natural number not less than 2) optical transmitting circuits for sending the intermittent optical signal;

n (n is a natural number not less than 2) optical receiving circuits for receiving the optical signal from each of said optical transmitting circuits; and

an optical transfer circuit for connecting each of said optical transmitting circuits and each of said optical receiving circuits, wherein

each of said optical transmitting circuits intermittently sends burst optical signals outputted by taking a provided intermittent signal as an original signal so as to prevent a collision among the burst optical signals,

said optical transfer circuit multiplexes the burst optical signals outputted from said optical transmitting circuits, separates the multiplexed burst optical signal into optical signals for every predetermined wavelength corresponding to said optical receiving circuits, and individually outputs the separated optical signals from n output ports provided thereto,

and

each of said optical receiving circuits converts the optical signal outputted from a corresponding one of said output ports into an electrical signal and intermittently outputs the electrical signal.

2. The optical communication apparatus according to claim 1, further comprising a wavelength traffic manager, wherein

each of said optical transmitting circuits includes a variable wavelength optical modulator for converting the intermittent signal into the burst optical signal, setting a wavelength thereof to any one of n predetermined varying wavelengths corresponding to said optical receiving circuits, and intermittently sending the burst optical signal,

said wavelength traffic manager controls the wavelengths of the burst optical signals sent from said variable wavelength optical modulators so as to prevent the wavelengths from coinciding with one another,

said optical transfer circuit includes

an optical multiplexer for multiplexing the burst optical signals outputted from said optical transmitting circuits and outputs a multiplexed optical signal;

a wavelength separator for separating the multiplexed optical signal inputted from said optical multiplexer into optical signals of the predetermined wavelengths

corresponding to said optical receiving circuits, and individually outputs the separated optical signals from the n output ports, and

each of said optical receiving circuits includes an optical receiver for converting the optical signal outputted from the output port corresponding thereto of said wavelength separator into the electrical signal, and intermittently outputting the electrical signal.

3. The optical communication apparatus according to claim 1, wherein

each of said optical transmitting circuits includes

a carrier modulator for modulating a carrier having a frequency unique to each of said optical transmitting circuits with the intermittent input signal to generate a burst modulated signal, and intermittently outputting the burst modulated signal, and

a variable wavelength optical modulator for converting the burst modulated signal from said carrier modulator into a burst optical signal, setting a wavelength thereof to any one of n predetermined varying wavelengths corresponding to said optical receiving circuits, and intermittently sending the burst optical signal,

said optical transfer circuit includes

an optical multiplexer for multiplexing the burst

optical signals outputted from said optical transmitting circuits, and intermittently outputting a multiplexed optical signal;

a wavelength separator for separating the multiplexed optical signal inputted from said optical multiplexer into optical signals of the predetermined wavelengths corresponding to said optical receiving circuits, and individually outputting the separated optical signals from the n output ports, and

each of said optical receiving circuits includes

an optical receiver for converting the optical signal outputted from the output port corresponding thereto in said wavelength separator into an electrical signal, and intermittently outputting the electrical signal,

a filter for receiving the electrical signal intermittently outputted from said optical receiver, selectively passing any one of said burst modulated signals from said m optical transmitting circuits based on the received electrical signal, and outputting the passed burst modulated signal, and

a burst demodulator for demodulating the burst modulated signal intermittently outputted from said filter.

4. The optical communication apparatus according to claim 3, further comprising an optical sub-transmitting circuit, wherein

said optical sub-transmitting circuit includes

a carrier generator for multiplexing reference carriers that are equal in frequency to and have a predetermined relation in phase with the carriers unique to said optical transmitting circuits, and outputting a multiplexed signal,

an optical sub-modulator for converting the multiplexed signal outputted from said carrier generator into an optical signal having a predetermined wavelength that is different from said n predetermined varying wavelengths corresponding to said optical receiving circuits, and sending the optical signal,

said optical multiplexer multiplexes the burst optical signals outputted from said optical transmitting circuits and the optical signal outputted from said optical sub-transmitting circuit, and outputs a multiplexed optical signal,

said wavelength separator separates the multiplexed optical signal outputted from said optical multiplexer into optical signals for each of the predetermined wavelengths corresponding to said n optical receiving circuits and an optical signal having a wavelength equal to the wavelength of the optical signal sent from said optical sub-modulator, and individually outputs the separated optical signals from the n output ports and a carrier output port provided thereto,

each of said optical receiving circuits further includes

an optical sub-receiver for converting the optical signal outputted from the carrier output port of said wavelength

separator into an electrical signal, and outputting the electrical signal, and

a sub-filter for receiving the electrical signal outputted from said optical sub-receiver, selectively passing any one of said m reference carriers based on the received electrical signal, and outputting the passed reference carrier, and

said burst demodulator demodulates the burst modulated signal intermittently outputted from said filter with reference to the reference carrier outputted from said sub-filter.

5. The optical communication apparatus according to claim 4, wherein

said burst modulated signal is generated by any one of frequency modulation and phase modulation.

6. The optical communication apparatus according to claim 5, wherein

said burst demodulator carries out synchronous detection of the burst modulated signal intermittently outputted from said filter with reference to the reference carrier outputted from said filter.

7. The optical communication apparatus according to claim 3, wherein

said carrier modulator modulates the carrier having the

frequency unique to each of said optical transmitting circuits to generate the burst modulated signal and intermittently outputs the burst modulated signal and the carrier,

each of said optical transmitting circuits further includes an optical sub-modulator for converting the carrier outputted from said carrier modulator into an optical signal having a predetermined wavelength that is different from n predetermined varying wavelengths corresponding to said optical receiving circuits, and sending the optical signal,

said optical multiplexer multiplexes the burst optical signals from variable wavelength optical modulator included in each of said optical transmitting circuits and the optical signal from said optical sub-modulator, and outputs a multiplexed optical signal,

said wavelength separator separates the multiplexed optical signal outputted from said optical multiplexer into optical signals for each of the predetermined wavelengths corresponding to said n optical receiving circuits and an optical signal having a wavelength equal to the wavelength of the optical signal sent from said optical sub-modulator, and individually outputs the separated optical signals from the n output ports and a carrier output port provided thereto,

each of said optical receiving circuits further includes an optical sub-receiver for converting the optical signal outputted from the carrier output port of said wavelength

separator into an electrical signal, and outputting the electrical signal, and

a sub-filter for receiving the electrical signal outputted from said optical sub-receiver, selectively passing any one of said m reference carriers based on the received electrical signal, and outputting the passed reference carrier, and

said burst demodulator demodulates the burst modulated signal intermittently outputted from said filter with reference to the reference carrier outputted from said sub-filter.

8. The optical communication apparatus according to claim 7, wherein

said burst modulated signal is generated by any one of frequency modulation and phase modulation.

9. The optical communication apparatus according to claim 8, wherein

said burst demodulator carries out synchronous detection of the burst modulated signal intermittently outputted from said filter with reference to the reference carrier outputted from said sub-filter.

10. The optical communication apparatus according to claim 3, wherein

each of said optical receiving circuits further includes

a monitor for monitoring the electrical signal outputted from said optical receiver to determine whether the burst modulated signal from each of said optical transmitting circuits is present or not, and, if present, controls said filter to selectively passing a predetermined burst modulated signal for output.

11. The optical communication apparatus according to claim 3, wherein

said filter and said burst demodulator are provided as many as the m optical transmitting circuits in each of said optical receiving circuits, and

each of said filters selectively passes a different one of the burst modulated signals from said m optical transmitting circuits, and intermittently outputs the passed burst modulated signal.